Oct 20, 2021

Region 4 SEMD's draft response to DOE for HQ's review.

Revised EPA proposed approach on EMDF Water Quality Values for Radionuclides and Associated Discharge Limits

All 22 radionuclides of concern (refer to table below) should have a risk-based instream water quality value (aka preliminary remediation goals (PRGs)) which are based on 10^{-5} target risk for recreational use. DOE should demonstrate during landfill operation compliance with instream water quality values for radionuclides consistent with Clean Water Act (CWA) regulations for chemicals. In addition, DOE should treat the contaminated landfill wastewater through a primary treatment consisting of a solids removal and chemical precipitation process prior to discharge and compliance sampling.

22 Radionuclides of Concern				
Cl-36	Am-241	Sr-90	U-238	Pu-238
Tc-99	Th-228	Ra-226	C-14	Pu-239
I-129	Th-230	Ra-228	Co-60	
Pb-210	Th-232	U-233/U-234	Cs-137	
Np-237	H-3	U-235/U-236	Eu-154	

Implementation:

1. The Focused Feasibility Study (FFS) and ROD should include the risk-based instream water quality values and the FFS will include the calculations, formulas, and assumptions used to develop those risk-based instream water quality values.
2. DOE should develop discharge (effluent) limits based on the risk-based instream water quality values, using site specific discharge and stream flow rates, consistent with CWA National Pollutant Discharge Elimination System (NPDES) program guidance and regulations, analogous to the method of developing discharge limits for chemicals based on CWA Ambient Water Quality Criteria (AWQC). Discharge limits for radionuclides (and chemicals) should be included in a post-Record of Decision (ROD) document (e.g., Remedial Design or Remedial Action Work Plan) because data needed to calculate those limits is not currently available. This is the same approach as used by the CWA NPDES program for chemicals.
3. Routine sampling should be conducted of discharge and/or in the receiving water body at the point of discharge to demonstrate compliance with risk-based instream water quality values for all 22 radionuclides, similar to the CWA NPDES program for chemicals.
4. Specifics of the monitoring program should be included in a post-ROD Federal Facilities Agreement (FFA) primary document such as the Remedial Action Work Plan.
5. Adjustments to compliance levels may be made as appropriate and scientifically justified. For example, compliance levels may be adjusted for analytical detection limits, background considerations, etc.
6. The Remedial Design document should determine the point of discharge and other factors related to assimilative capacity.

Assumptions:

1. A site-specific fish consumption rate, along with standard CERCLA risk assessment duration of 26 years, would be used in the calculation of the risk-based instream water quality values and associated discharge limits.
2. Fish tissue sampling may be conducted in Bear Creek for comparison to risk-based fish tissue levels (based on 10^{-5} risk and recreational use).
3. Additional site-specific fish studies may be conducted to confirm exposure assumptions or bio-concentration factors (BCFs) used in the calculating the risk-based instream water quality values. If results of such studies indicate potential changes to exposure assumptions or BCFs then the ROD may be amended to include the revised risk-based instream water quality values.

Additional Information

Region 4 SEMD is working with TDEC and Region 4 Water Division to ensure that the correct process to develop water quality-based effluent limits within the CWA NPDES program and TN NPDES regulations are followed. Below is more detail on how this will be accomplished.

DOE will calculate risk-based instream water quality values (similar to CWA AWQCs for chemicals) for radionuclides based on a 10^{-5} risk level for recreational use in Bear Creek. Those numbers, including underlying assumptions, will be presented in the forthcoming revised draft FFS. Currently the revised version of the draft FFS is due from DOE on 10/21/21, but an extension request is expected. The draft FFS is subject to EPA and TDEC review and approval. The EPA review of the revised draft FFS will determine whether the risk-based instream water quality values are acceptable including there being well-reasoned justification for any deviation from use of CWA default parameters or use of CWA guidance for development of certain site-specific parameters in lieu of use of defaults. Once approved, the 10^{-5} risk-based instream water quality values will be in the final FFS, the ROD and the public fact sheet.

Once those risk-based instream water quality values are established, effluent discharge limits will be calculated based on those risk-based instream water quality values in the same manner that the CWA NPDES program regulations and guidance provide for developing permitted discharge limits for wastewater based on AWQC. It is a two-step process for water quality-based effluent limits:

Step 1: Develop risk-based instream water quality values protective of the designated use of the creek.

The 10^{-5} risk-based instream water quality values protective of the designated use of the creek will be developed and presented in the revised draft FFS. Once approved, those values will be presented in the public information fact sheet and ROD. To the extent that risk-based instream water quality values for radionuclides in Bear Creek deviate from the relevant EPA Office of Water guidance, CWA guidance default values or TDEC guidance default values, such as the use of site-specific fish consumption rates, any deviation must be supported by a well-reasoned and documented rationale for using specific parameters in place of CWA guidance or defaults. This reasoning will be included in the ROD and the public fact sheet.

Step 2: Develop effluent discharge limits to ensure compliance with the instream water quality values.

Water quality-based effluent discharge limits will be developed and monitored consistent with regulations and guidance established under the CWA NPDES program and TN NPDES regulations. EPA understands that specific effluent discharge limits are dependent on design parameters such as the assimilative capacity of the receiving surface water body at the point of discharge, which are not available at this point in the project. The water quality-based effluent limits will be included in a post ROD FFA primary document (i.e., Remedial Design or Remedial Action Work Plan) subject to EPA and TDEC approval. This is the same process as used for the non-radionuclide AWQCs and is consistent with using the CWA as a relevant and appropriate requirement (RAR).

The assimilative capacity of the receiving water body, as well as whether the discharge is continuous or "hold and release" for example, factor into the conversion of an instream water quality value and/or AWQC into a discharge limit designed to be compliant with the corresponding water quality value. DOE is not prepared to specify a EMDF discharge location on the creek and other system parameters pre-ROD. Until the manner and location of discharge is specified, the assimilative capacity cannot be determined, and thus we cannot develop the "end of the pipe" discharge limit for the ROD. Discharge limits based on the instream water quality values will be determined in a post ROD FFA primary document (i.e., Remedial Design or Remedial Action Work Plan).

Consistent with the approach used by CWA NPDES permit writers to work with the permit applicant, prior to the public comment period, EPA, TDEC and DOE must agree on a calculated risk-based instream water quality value for all radionuclides associated with the EMDF (for chemicals, these values are the promulgated AWQCs). Region 4 Water Division personnel indicated that the in the typical NPDES process the state or EPA permit writer develops the instream limits and provides them to the applicant, who then develops discharge concentration limits consistent with their wastewater treatment and conveyance process, subject to regulatory approve. The same approach will be used for the DOE EMDF.

DOE will identify the discharge point an associated assimilative capacity and develop and propose the chemical and radionuclide discharge limits compliant with the instream quality values in the Remedial Design Report, Remedial Action Work Plan, or another Primary document as identified by the FFA. By inclusion in a Primary document, the FFA review and approval process, and dispute process, if necessary, will govern the approval.